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Risk Assessment at Sediment Sites – Issues, Uncertainties, and Recommended Approaches

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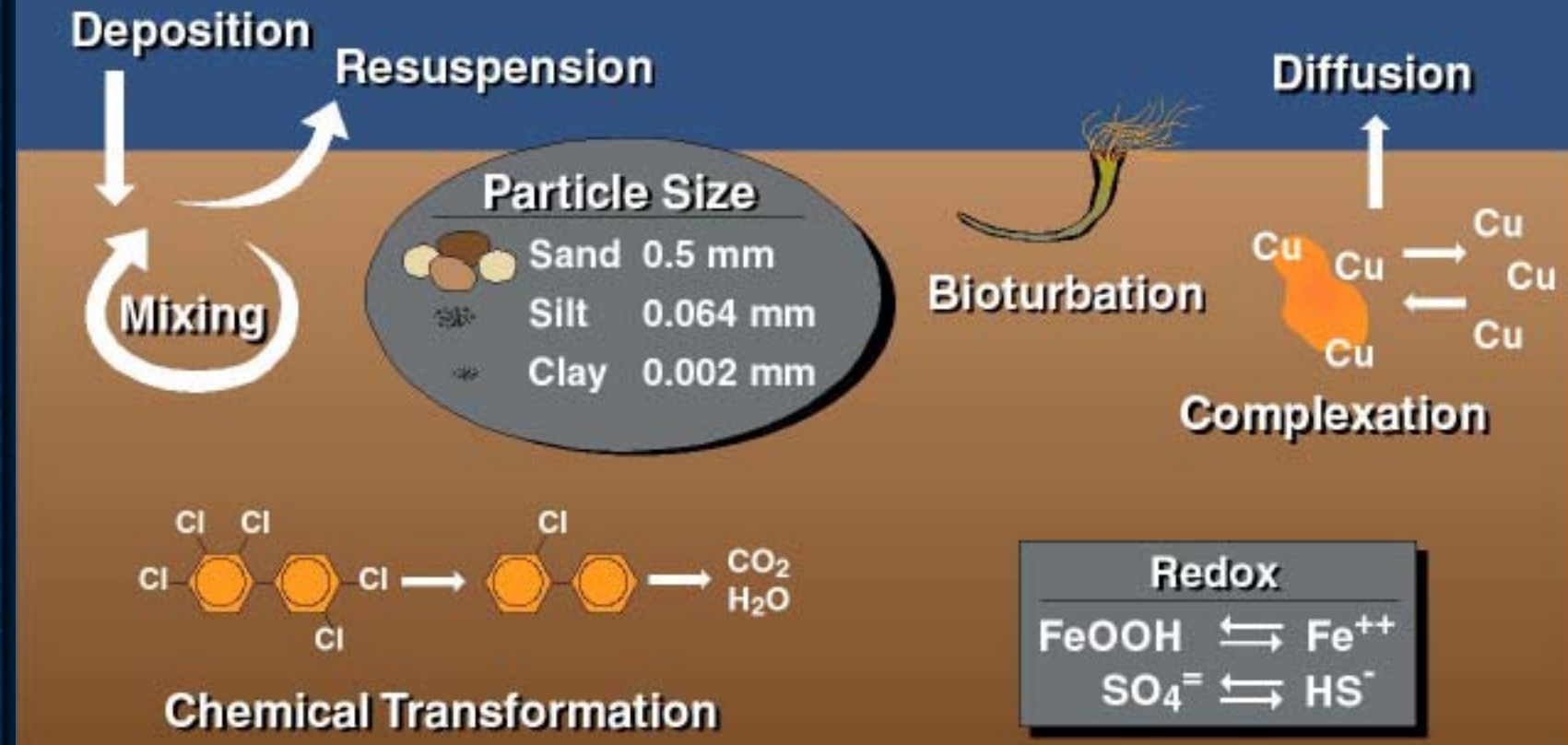
Risk Assessment Framework

- Must consider unique features of sediments:
  - Transport/fate process
  - Exposure pathways
  - Site-specific receptors
  - Adverse effects of remediation

Important Processes and Characteristics

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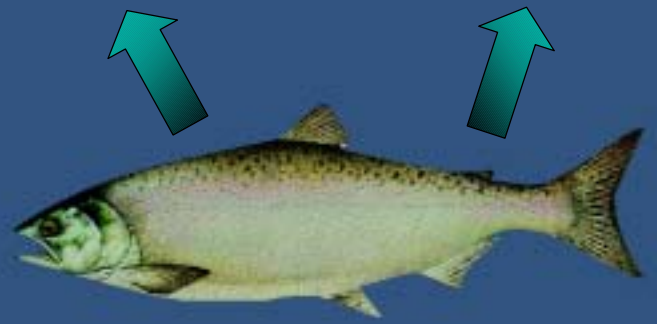
Assessment and Measurement Endpoints Must Be Meaningful to Risk Manager and Form a Sound Basis for Remedial Decision

- Survival
- Growth
- Reproduction
- Population Size
- Enzyme Induction
- Histopathology
- Immunosuppression

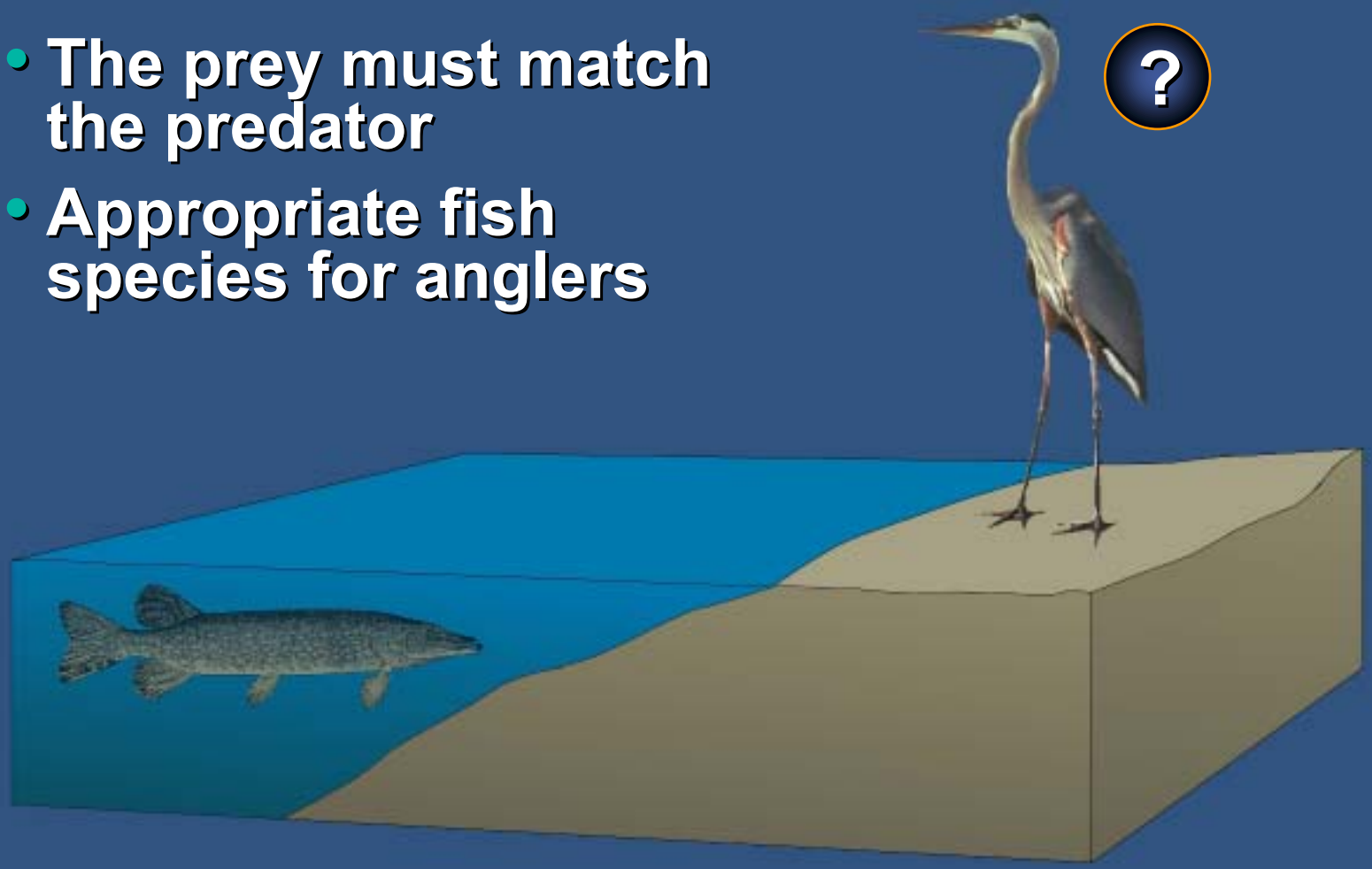


Assessment Endpoint

Risk Manager

Realistic Exposure Pathways

- The prey must match the predator
- Appropriate fish species for anglers



Approaches to Ecological Risk Assessment at Sediment Sites

1 Theoretical – Deterministic Model (TQ)

Use for:

- Screening-level assessments or small, simple sites
- Should use multiple exposure/toxicity scenarios
- Must recognize conservative assumptions and lack of exposure-response relationship
- Second tier probabilistic assessment may be useful

Approach to Ecological Risk Assessment at Sediment Sites
(continued)

2 Empirical

Use for:

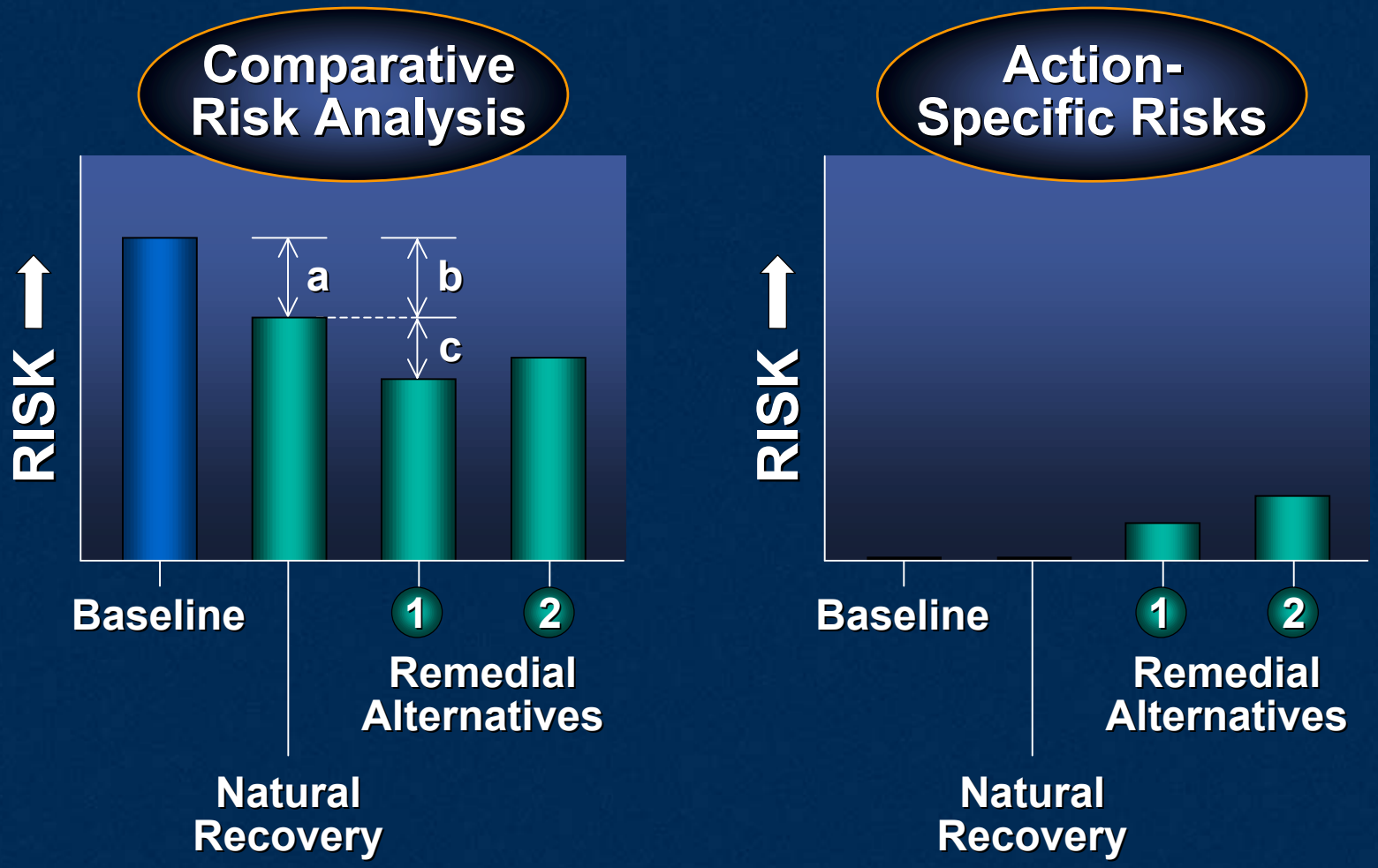
- Larger, complex sites
- Site-specific information on exposure, toxicity, and population effects
- Fish – laboratory studies, population size
- Benthos – triad studies
- Birds and mammals – reproductive performance, population status

Risk to Human Health

- Use site-specific data to estimate exposure
  - Dermal contact
  - Sediment ingestion
  - Angler catch rate
  - Species/size caught

Sediment Remedial Actions Result in Risks of Adverse Effects to Ecological Receptors and to Humans

Comparative Risk Analysis



Risk Management Framework

- Exposure assessment must consider unique characteristics of sediments and site-specific factors
- Assessment and measurement endpoints must be interpretable by the risk manager
- Action-specific risks must be considered
- Remedial decisions should be based on “net” risks for the site